

## **Supplementary Online Material**

The *Avahan* programme has mainly targeted FSWs, high-risk men who have sex with men and transgenders (MSM-T), other high-risk men, such as clients of FSWs and truck drivers, and IDUs. Peer-based outreach education, clinical services for managing STIs, promotion and distribution of condoms, community mobilization and building an enabling environment are the key elements of the programme. The programme was implemented in 83 districts, with some districts where *Avahan* was the first or only such programme, and others where it added to already existing programmes.

## **Methods**

### *Study population*

We used two rounds of IBBA survey data collected from the clients of FSWs in 17 target districts of four southern Indian states: Karnataka, Tamil Nadu, Andhra Pradesh and Maharashtra. Both survey rounds followed the same study design and sampling procedures. The study design as well as the procedure followed for round-1 survey has been described elsewhere.<sup>1,2</sup> Briefly, random samples of clients of FSWs were selected using cluster or time-location cluster sampling, depending upon the local sex work typology. The target sample size for each district in each round was 400, except for Bangalore (Karnataka state), where it was 700. In the districts of Andhra Pradesh, Tamil Nadu and Maharashtra, the data collection was carried out during the years 2006-07 and 2009-10. However, in the districts of Karnataka, the IBBA among clients of FSWs were carried out during the years 2007-08 and 2011-12.

Clients of FSWs who provided consent were interviewed using a structured questionnaire by trained field interviewers and information was collected on socio-demographic

characteristics, sexual behaviours, and condom use. Blood and urine samples were collected from all consenting men for HIV and STI testing. Blood was tested for HIV using standard serological tests and urine was tested using nucleic acid amplification methods for *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT). However, in the districts of Karnataka, CT and NG was not tested for in the round-2 IBBA survey. Serum samples were tested for syphilis antibodies using a Rapid Plasma Reagin (RPR) test (Span Diagnostics, Surat, India). All samples positive by RPR were then tested with a Treponema Pallidum Haemagglutination Assay (TPHA) test (Glaxo-Omega, Alloa, Scotland, United Kingdom). A subject was considered as having active syphilis when both the RPR and TPHA tests were positive.

#### *District level programme and contextual variables*

A standard set of core programme indicators was available for all districts covered by *Avahan* as part of a management information system and the details of these indicators are discussed elsewhere.<sup>3</sup> We used three programme variables for this study: 1) the number of FSWs ever contacted by the programme in a given year; 2) the number of FSWs contacted monthly by the programme; and 3) the number of condoms distributed to FSWs by the NGOs in a given year. These numbers were converted into percentages using the estimated number of FSWs in the district as the denominator for indicators 1 and 2; for indicator 3, we used as the denominator the expected number of condoms needed by FSWs in the district, based on the estimated number of FSWs and the mean number of client-contacts estimated from the IBBA data. These indicators were computed for years 2006 to 2008 as the information was complete for all districts only for this time period (the program started being handed over to the government in 2008). We used the value of the indicators in 2006 and the difference in the value between 2008 and 2006 in the statistical analysis.

We also used several contextual variables at the district level collected from multiple sources for all 17 districts, and the complete list of the variables used in the multilevel model are provided in the appendix table. The contextual variables considered are thought to reflect the socio-demographic and economic development of the district and also influence the sex work environment.

### *Ethical considerations*

No names or other contact information were recorded either on the questionnaire or on the biological samples collected. A detailed and standardized consent process was implemented for each respondent, and consent was obtained separately for the interview and for collecting biological samples. The study was approved by the ethics committees of all institutes that were involved in the data collection for this study: the National AIDS Research Institute, Pune (Maharashtra), the National Institute of Epidemiology, Chennai (Tamil Nadu), the National Institute of Nutrition, Hyderabad (Andhra Pradesh), and St. John's Medical College, Bangalore (Karnataka), India, as well as Family Health International, Arlington, VA, USA, and the University of Manitoba, Winnipeg, Canada. Finally, statutory approval for the IBBA and its protocols was obtained from the Health Ministry Screening Committee (HMSC) of the Indian Council of Medical Research, Government of India.

<sup>1</sup>Saidel T, Adhikary R, Mainkar M *et al.* Baseline integrated behavioural and biological assessment among most at-risk populations in six high-prevalence states of India: design and implementation challenges. *AIDS* 2008; **22 (Suppl 5)**:S17-34.

<sup>2</sup>Subramanian T, Gupte MD, Paranjape RS *et al.* HIV, sexually transmitted infections and sexual behaviour of male clients of female sex workers in Andhra Pradesh, Tamil Nadu and Maharashtra, India: results of a cross-sectional survey. *AIDS* 2008; **22 (Suppl 5)**:S69-79.

<sup>3</sup>Verma R, Shekhar A, Khobragade S *et al.* Scale-up and coverage of Avahan: a large-scale HIV-prevention programme among female sex workers and men who have sex with men in four Indian states. *Sex Transm Infect* 2010; **86 (Suppl 1)**:i76-82.